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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/484,348	01/18/2000	Stanley E. Swirhun	36903/SAH/C715	9594

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EXAMINER
LOUIE, WAI SING

ART UNIT	PAPER NUMBER
2814	

DATE MAILED: 09/19/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/484,348	SWIRHUN ET AL.	
	Examiner	Art Unit	
	Wai-Sing Louie	2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 22-39 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 22-39 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Objections

Claims 36-39 are objected. They are depending on canceled claims. Appropriate correction is required.

Specification

35 U.S.C. 112, first paragraph, requires the specification to be written in "full, clear, concise, and exact terms." The specification is replete with terms, which are not clear, concise and exact. The specification should be revised carefully in order to comply with 35 U.S.C. 112, first paragraph. Examples of some unclear, inexact or verbose terms used in the specification are:

- Page 11, 70 is referenced for n+ layer and Cathode layer (page 12).
- Page 12, "metal patterns" is numbered 62 and 66 (see fig. 3).
- Page 12, 79 is referenced for metal extender and GaAs substrate (page 13).
- Page 14, 82 is referenced for contact and anode terminal.
- Page 14, 91 is referenced for anode of VCSEL and VCSEL.
- Page 16, 130 is referenced doe chip and integrated semiconductor.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or

improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 22-29, 31, and 33-34 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-18 of U.S. Patent No. 6,392,256. Although the conflicting claims are not identical, they are not patentably distinct from each other because

With regard to claim 22, US 6,392,256 discloses a monolithic optical transmitter and receiver pair comprising:

- A semiconductor substrate (claims 1 and 2);
- An optical transmitter formed on the substrate (claims 1 and 4);
- An optical receiver formed laterally adjacent the optical transmitter, the optical receiver optically and electrically isolated from the optical transmitter (claims 1 and 6).

With regard to claim 23, US 6,392,256 discloses the optical receiver comprises a photodiode (claim 1).

With regard to claim 24, US 6,392,256 discloses the optical transmitter comprises a VCSEL having a plurality of layers (claim 1).

With regard to claim 25, US 6,392,256 discloses the VCSEL comprises an isolation region defining discrete areas of the active VCSEL layers and the inactive VCSEL layers (claims 6 and 11).

With regard to claim 26, US 6,392,256 discloses a means for disabling inactive VCSEL layers (claim 8).

With regard to claim 27, US 6,392,256 discloses the optical transmitter comprises:

- A first mirror layers formed on the substrate (claim 12);
- A first cladding layer formed on a top most first mirror layer (claim 12);
- An active region formed on said first cladding layer (claim 12);
- A second cladding layer formed on said active region (claim 12);
- A second mirror formed on said second cladding layer (claim 12).

With regard to claim 28, US 6,392,256 does not disclose the active region comprises at least one quantum well layer. However, a quantum well provides the carriers to generate and recombine efficiently in the active region. Therefore, it would have been obvious to provide a quantum well in the active region.

With regard to claim 29, US 6,392,256 discloses a distributed p-type layer formed on the VCSEL (claim 3), but does not disclose the epitaxially grown distributed Bragg reflectors (BDR). However, it is common to form BDR in the VCSEL in order to have the reflective index for the device and to have the lattice matched with the other layers. Therefore, it would have been obvious to one with ordinary skill in the art to have the epitaxially grown distributed Bragg reflectors in order to have the lattice match and the correct reflective index.

With regard to claim 31, US 6,392,256 discloses optical receiver comprises:

- A distributed p-type layer formed on said VCSEL layers (claim 3);
- An intrinsic layer formed on said distributed p-type layer (claim 3);
- An n-type layer formed on said intrinsic layer (claim 3);
- A photodiode cathode contact formed on the n-type layer (claim 18);
- A photodiode anode formed on the topmost second mirror layer (claim 18).

With regard to claim 33, US 6,392,256 discloses a non-reflective coating on the optical receiver (claim 10).

With regard to claim 34, US 6,392,256 discloses a photodiodes formed on the semiconductor substrate (claim 11).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

Claims 22-26, 28-29, 32, and 34-35 are rejected under 35 U.S.C. 102(e) as being anticipated by Olbright et al. (US 5,266,794).

With regard to claim 22, Olbright et al. disclose an integrated light emitting device and photodetector (col. 3, line 48 to col. 9, line 39 and fig. 9) comprising:

- A semiconductor substrate 200 (fig. 8);
- An optical transmitter 180 formed on the substrate 200 (fig. 8);
- An optical receiver 190 formed laterally adjacent the optical transmitter 180, the optical receiver 190 optically and the substrate 200 is intrinsic, which is electrically isolating the optical receiver from the optical transmitter (fig 8).

With regard to claim 23, Olbright et al. disclose the optical receiver comprises a photodiode (col. 7, line 60).

With regard to claim 24, Olbright et al. disclose the optical transmitter comprises a VCSEL having a plurality of layers (fig. 8).

With regard to claim 25, Olbright et al. disclose the VCSEL comprises an isolation region defining discrete areas of the active VCSEL layers and the inactive VCSEL layers (fig. 8).

With regard to claims 26 and 32, Olbright et al. disclose the means for disabling inactive VCSEL layers is by electronically disabling the associated transmitters (col. 4, lines 20-24).

With regard to claim 28, Olbright et al. disclose the active region comprises a multiple quantum well layer (col. 8, line 14).

With regard to claim 29, Olbright et al. disclose the first and second mirrors are epitaxially grown distributed Bragg reflector layers (col. 8, line 13).

With regard to claim 34, Olbright et al. disclose a photodiodes formed on the semiconductor substrate (fig. 8).

With regard to claim 35, Olbright et al. disclose a monolithically integrated optical device having a VCSEL and an optical receiver. The receiver can comprise a metal-semiconductor-metal photodiode (Olbright col. 7, lines 59-61).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 30-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Olbright et al. (US 5,266,794) in view of Hasnain et al. (US 5,136,603).

With regard to claim 30, Olbright et al. do not disclose a photodiode formed on a top most second mirror layer of the VCSEL layers. However, Hasnain et al. disclose forming a PIN photodiode formed on a top most second mirror layer of the VCSEL layers (Hasnain fig. 1). Hasnain et al. teach the photodiode is integrated with the VCSEL becomes a single mode operation and have low divergence optical output (Hasnain col. 1, lines 45-53). Therefore, it would have been obvious to one with ordinary skill in the art to place the photodiode on the top most second mirror layer in order to operate the device as a single mode and have low divergence optical output.

With regard to claim 31, Olbright et al. disclose optical receiver comprises:

- A p-type layer 220a formed on a portion of the VCSEL layers (fig. 8);
- An n-type layer 230a (fig. 8);
- A photodiode cathode contact 330 formed on the n-type layer (fig. 8);
- Olbright et al. do not disclose an intrinsic layer. However, one with ordinary skill in the art would know a PN photodiode could be replaced by a PIN photodiode to improve the confinement of the carriers, such as the device disclosed by Hasnain et al., which has a PIN photodiode on top of the VCSEL. Therefore, it would have been obvious to have a PIN diode and having an intrinsic layer on top of the p-type layer 220a;
- A photodiode anode 320 formed on the p-type layer 220a (fig. 8). Although, the contact is not made on the top most second mirror layer, but the contact is made on a p-layer of the PIN photodetector to complete the circuit and, therefore, is considered as equivalent.

Claims 27 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Olbright et al. (US 5,266,794) in view of Lebby et al. (US 5,498,883).

With regard to claim 27, Olbright et al. disclose the optical transmitter comprises:

- A first mirror layers 270 formed on the substrate (fig. 8);
- An active region 250 formed on said first cladding layer (fig. 8);
- A second mirror 260 formed on said second cladding layer (fig. 8);
- Olbright et al. do not disclose a first and a second cladding layer formed on a top and beneath the active layer. However, cladding layers are used in VCSEL to

improve the confinement of the carriers, which is common in the art, such as disclose in Lebby et al. (Lebby col. 3, lines 24-43 and fig. 3). Therefore, it would have been obvious have cladding layers surrounding the active region.

With regard to claim 33, Olbright et al. do not disclose using a non-reflective coating. However, Lebby et al. disclose an anti-reflective coating is used in the device (fig. 3). Lebby et al. teach the anti-reflective coating suppresses lasing (Lebby col. 5, lines 27-30). Therefore, it would have been obvious to one with ordinary skill in the art to apply anti-reflective coating on the device. Doing so could control the light by suppress lasing.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wai-Sing Louie whose telephone number is (703) 305-0474. The examiner can normally be reached on 7:30 AM to 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on (703) 306-2794. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

wsl
September 15, 2002

Olik Chaudhuri
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